Residential Sprinkler Ordinance For The City of Sparks

Strategic Management of Change

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ABSTRACT

The problem was that the Sparks Fire Department did not have a fire station in the northern section of the city. This area is all new developments, mostly upscale single family dwellings ranging in price from $150,000.00 to $300,000.00. The average response time from the closest fire station was 8.89 minutes. Because of the long response times, the fire chief directed the fire marshal to work on a residential fire sprinkler ordinance that would require fire sprinklers in new single family dwellings at the time of construction. The purpose of this paper was to research residential fire sprinklers and determine the feasibility of such an ordinance for the City of Sparks. The evaluative research method was used to answer the following questions:

1. What would the cost per dwelling be for a fire sprinkler system, and what incentives would increase support for residential fire sprinklers?
2. What are the objections of the Builders Association of Northern Nevada against residential sprinklers?
3. What have other cities done concerning residential fire sprinklers?

The procedures used were researching various trade magazines and books, interviews and meetings with the fire marshal, the city elected officials and builders association. Also researched was how many other fire departments in Nevada currently have residential fire sprinkler ordinances. A great deal of information was taken from the Internet.

Results of the survey indicated that although fire sprinklers are relatively cost effective and operationally very effective, they were not being used widely in single family dwellings. The builders association had many objections to sprinklers, primarily cost of installation. Facts were presented both

pro and con for sprinklers. Also studied was what other cities in the United States had done to implement residential fire sprinkler ordinances. The research revealed that the majority of cities who had been successful had suffered fires in which there had been multiple fatalities.

Recommendations were made to continue with the process of enacting the sprinkler ordinance within the City of Sparks, with cooperation from the builders association, the sprinkler industry and input from legal and engineering departments within the city.

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INTRODUCTION

The City of Sparks is growing rapidly is what is called the North Valley, this is an area primarily designed for upscale single family residential homes, although there is also a planned development including at least one hotel, golf courses and some multi-family residential dwellings.

This section of the city has been designated as Fire District #5 in the Sparks Fire Department dispatch program. The problem is that there is not a city fire station located in this district and the fire department was proposing a residential fire sprinkler ordinance.

The purpose of this research paper was to determine the cost to developer, builder and home buyer for residential sprinklers in new single family dwellings. To determine the support for an ordinance from elected officials and objections of the builders. Finally, to determine what alternatives there were should the ordinance fail. This research paper employed an evaluative methodology to answer the following questions:

1. What would the cost per dwelling unit be for a fire sprinkler system, and what incentives would increase support for residential fire sprinklers?
2. What are the objections of the Builders Association of Northern Nevada against residential sprinklers?
3. What have other cities done concerning residential fire sprinklers?

The procedures used to complete this research included a review of fire service journals, magazines and fire service standards. A review of many Internet articles on residential fire sprinklers a comparison of other cities requiring residential sprinkler systems and a review of the City of Sparks, City Council meetings dealing with a proposed ordinance

BACKGROUND AND SIGNIFICANCE

The City of Sparks is growing rapidly in the Northern section of the city. This area is designated as fire district #5. The area is planned for primarily residential dwellings although there are plans for shopping, recreational and a resort including a hotel and casino. There is not a city fire station yet located in the district and nothing is planned for at least two years. The closest city fire station is fire station #4, located to the south of this district. Fire station #4 is approximately five miles from the northern border of district #5. Because of this distance, response times were very long into district #5. Since this is a new portion of the city, there have been very few calls into the district. The majority of calls have been Emergency Medical Service (EMS) calls which overall account for 73% of the calls the fire department responded to in 1997. According to 1997 records,(Sparks Fire Department Annual Response Report, 1997), there were 135 total calls in district #4, this district included the new area to the north which is now designated as district #5. The average response time into district #5 exceeded 8.5 minutes, because of the distance from fire station #4.

Fire station #4 currently provides emergency services to district #5, it is a single company station with a 1500 G.P.M. pumper (E-41), and is staffed with four personnel. One of the firefighters assigned to E-41 works as a Firefighter Inspector during the hours from 0800-1700. During these hours, the firefighter is not on the engine, but is in a fire department vehicle conducting fire inspections. This is important because the lack of the firefighter on the engine when it arrives at an incident, will affect the company operations and may keep the company from making a quick interior attack because of the 2-In/2-Out rule. Residential fire sprinklers would reduce the amount of fire damage in this situation. This station, along with a pumper from fire station #2 and a ladder truck and a battalion chief from fire

station #1 would respond on a structure fire to district #5. The response from fire station #2 is well over 8.5 minutes and from fire station #1 up to 12 minutes. The department also has an automatic aid agreement with the Truckee Meadows Fire Protection District (TMFPD), to respond one engine from the county fire station #7, located at the northern edge of the city limits. This company, when in quarters can beat Sparks Engine #41 into the majority of district #5. The drawback to relying on the automatic aid agreement with TMFPD is that Engine-7, which is the first TMFPD apparatus is out of their station a majority of the time and in fact, they rely on Sparks E-41 for automatic aid in this district.

As far back as 1995, the Sparks Fire Prevention Bureau (SFDFPB), began requiring the installation of residential fire sprinklers in residential occupancies, both single family and multi-family, based on certain criteria. This criteria included, response times, water supply, fire department access and slopes. Nearly every time the bureau would require a system, there was a battle from the developer, builder or homeowner. Although there was documentation that sprinklers save lives and property, they were a difficult sell in the City of Sparks. An article taken from the Internet, (Residential Fire Safety Institute, October 1999), indicated that fire records indicated that 93% of fires were controlled by one sprinkler head. The remaining 7% of fires were handled by no more than four sprinkler heads. The impact of this ordinance on the department is that structures with sprinklers suffer less damage from fire and water when response times are long. The future impact to the fire department should the ordinance fail, is that firefighters arriving will find larger amounts of fire and greater potential for loss of life or injury to both firefighters and the public. This research paper applies to the National Fire Academy Executive Fire Officer Program, "Strategic Management of Change" class in that the staff of the department would have to support a change in city ordinances that may be

very unpopular in the public and private sectors. Getting a buy in from staff officers, who feel this is a band-aid solution to the problem of not having a fire station in the district may be very difficult. A successful resolution to the problem of lack of fire protection in fire district #5 and future developments not meeting a recognized response time would be implementation of a residential fire sprinkler ordinance through the city council. A sprinkler ordinance alone, however, is not the complete solution to the problem. Fire stations must be built in new developments to provide the many other services needed by the public. An ordinance, in conjunction with new fire stations, apparatus and staffing will provide the best protection for both lives and property. Developers must realize that growth requires additional services and that they must share some of the cost. Currently is Sparks, new residential construction requires an impact fee of $200.00 per dwelling. Of that amount, $60.00 is shared by police and fire, the remaining amount goes to parks. Without some solution to the problem, it will only worsen as the city continues to grow.

LITERATURE REVIEW

The first question asked in the research paper was the approximate cost of installing residential fire sprinklers in new dwellings at the time of construction and what incentives there are for installation of sprinklers. The added cost for a residential fire sprinkler system in a new dwelling is the primary reason builders associations object to the proposal. An informational document produced by the Builders Association of Northern Nevada in October 1999. Listed the following amounts for installation of residential fire sprinklers in both new and existing homes. They proposed that existing dwellings be required to have sprinklers installed at the time of resale, but were still not in favor of putting sprinklers in new homes.

1. New Dwellings: $4000.00 per home
2. Existing Dwellings: $6000.00 per home

According to an article in "Better Homes and Gardens" (September 1999), the estimated cost for a residential fire sprinkler system is approximately two percent, not quite the $4000.00 estimated by the builders association. Additionally, the cost of fire sprinklers continues to go down as more are built. An article from the Internet from the Residential Fire Safety Institute indicated that fire sprinklers add approximately one percent or less to the cost of a new home. This article also compare the cost of sprinklers to that of upgrading carpet in a new home. Sprinklers should last for the life of the home, while carpets must be replaced every ten years.

About the effectiveness of sprinklers, the article discussed the following items: Homes with recommended number of properly operating smoke detectors provide for a 47% survival rate in a fire. When fire sprinklers are added, that survival rate increases to over 97%. This is because the sprinkler

will activate before the fire grows large enough to spread the killers in a fire, smoke and toxic gasses. Usually, one sprinkler head is enough to control a fire, prior to the arrival of the fire department. Another Internet article from the Residential Fire Safety Institute, (firesafe.home.org), December 1999, discussed incentives which may make residential sprinkler ordinances easier to pass. These incentives include economic, such as low interest loans. The second is design alternatives like reduced fire flow, increased hydrant spacing. The table below lists the incentive and who benefits, this is not a complete list, but examples, not in any particular order.

Table #1: Incentives For Fire Sprinklers

Incentives **Who Benefits**

	Developer	Builder	Installer	Homeowner
Reduced Impact Fees	X	X		
Low Cost Loans	X	X		X
Increased Density	X			
Hydrant Spacing	X			
Longer Access Distance	X			
Longer Cul-de-sacs	X			
Reduced Turnaround Radius	X			

Increased Fire Station Dist.	X			X
Reduced Permit Fees		X	X	
Reduced Plan Review Fees		X	X	
Lower Insurance Premiums			X	X
Lower ISO Ratings				X
Reduced Fire Assessments				X
Lower Property Tax				X
Narrower Streets	X			
Fewer Parking Restrictions	X			
No Large Meter Fee			X	X

As the table shows, there are many benefits to primarily the developer and the homeowner when residential fire sprinklers are installed. In spite of these benefits, the Builders Association of Northern Nevada remains opposed to any ordinance requiring the installation of residential fire sprinklers at the time of construction. The Home Fire Sprinkler Coalition, in an Internet article (firesprinkler.org, November 1999), listed the following information concerning residential fire sprinklers:

1. Eight out of 10 fire deaths in the U.S. occur in the home.

2. Home fire sprinklers can contain and may even extinguish a fire in less time that it would take the fire department to arrive on the scene.

3. Installing both smoke alarms and a fire sprinkler system reduces the risk of death in a home by fire by 82%, relative to having neither.

4. Home sprinklers are cost-effective, especially when installed during new construction. Often they add only 1 to 11/2% of the total building cost.

5. Only the sprinkler closest to the fire will activate. Ninety percent of fires are controlled by one sprinkler.

6. Home fire sprinklers use only a fraction of the water used by fire department hoselines.

7. Nationwide, more that 4,000 people die in fires each year.

Also from the same article, was a comparison of two structure fires, one had sprinklers, the other did not. This is the story of the McCabes (no sprinklers) and the Miziochs (sprinklered). The fires were very similar in nature, but had very different outcomes. The following table tells the story.

Table #2: **A Tale of Two Families**

The McCabe Family (No Sprinklers)	**The Mizioch Family (Sprinklered)**
Injuries: No (2 pets died in the fire)	Injuries: None
Sprinklers: Not installed	Sprinklers: Yes. One sprinkler activated
Loss: $125,000.00	Loss: $3000.00

The above comparisons, combined with cost of installation, length of life of the sprinkler system, financial benefits to both the developer and the homeowner should make the benefits of residential fire sprinklers obvious. "The Best Life Safety Device Ever Invented", this quote is from the Residential Fire Safety Institute, (firesafehome.org) December 1999. According to this article, the National Fire Protection Association (NFPA), reports that people with smoke alarms in their home have a 50 percent better chance of surviving a fire. Adding sprinklers and smoke alarms increases their chances of surviving a fire by over 97 percent. The article also states that residential fire sprinklers are designed to save lives, but because they control fires so quickly, they also reduce property damage. Fire report show that property damage is nine times lower in sprinklered homes.

The second question was to determine what the main objections the Builders Association of Northern Nevada has against residential fire sprinklers. An article taken from the Internet (firesafehome.org) December 1999, listed the primary objections from home builders concerning residential fire sprinkler systems. According to the article, when a fire chief proposes a residential fire sprinkler ordinance, he or she will receive a letter from the local builders why the ordinance is a bad idea. This very thing happened in Sparks when the ordinance was proposed. The following is a list of "facts" listed by the builders association. They are as follows:

1. Losses don't warrant the systems.
2. Sprinklers won't affect fire department staffing levels or number of stations.
3. Older homes are the problems, not the new ones.
4. New homes are safer because of hard-wired smoke detectors with battery backup.

5. Sprinklers systems are too expensive. Adding $2500-$3500 to the cost.

6. Sprinklers do not always put out fast-flaming fires and smoldering fires may cause deaths and smoke damage without activating the sprinklers.

7. Insurance companies rarely give discounts for sprinklers.

8. The cost of the sprinklers will prevent many people from becoming home buyers.

9. New homes are safer because of new construction codes.

10. Sprinklers may leak and cause water damage even when there is no fire.

As stated in the article, to the statements may seem plausible to those unfamiliar with fire sprinklers and home construction. The facts, however, proved all the statements wrong. In the article, the statements by the builders association, were proved wrong by a discussion of the facts. The discussion of the statements and replies are not included in this research paper. As part of the negotiations between the City of Sparks and the Builders Association of Northern Nevada, these same questions were asked of the Fire Marshal. Additionally, they stated "the real problem isn't fire deaths in new homes, but rather the fact that the City of Sparks cannot provide adequate fire protection service to the new neighborhoods". They equate the sprinkler ordinance to "slapping a very, very expensive band-aid on a dying patient". The builders association report also stated that only 1.3 percent of fire deaths are in homes less than ten years old and the other 98.7 percent of fire deaths occurred in home more than 10 years old, with the highest percentage 48.3 percent, in homes older than forty years. The proposal in the City of Sparks was based strictly on response times. Any dwelling that was more than 8.5 minutes from any city fire station would be required to have residential fire sprinklers installed at the time of construction. The standard response time used by the Sparks Fire Department is 6.5 minutes from

receipt of call and was calculated using the following criteria:

1. One (1) minute from receipt of call in dispatch to fire department alert.
2. One and a half (1 ½) minutes from alert to fire department en route time.
3. Four minutes travel time for the apparatus to arrive at the scene of the emergency.

This totals six and a half minutes, which is the standard response time for the City of Sparks Fire Department. The eight and a half minute response time exceeds the standard for the city by two minutes, otherwise there would have been many more dwellings affected by the proposed ordinance.

The third question was to determine what other cities in the United States have done to require residential fire sprinklers in new dwellings. Many other cities in the United States are struggling to convince elected officials that residential fire sprinklers are needed in areas where fire hydrants are scarce or where fire department response times are excessive. An article in the American Fire Journal (October 1997), discussed a fire in Tucson, Arizona in 1995 where a famous sound stage and backdrop for many western movies was destroyed by fire because the only water supply, an above ground tank was blocked by fire. This fire initiated a study of building permits for single family dwellings concerning new structures and water supply for fire protection. The eight month study revealed that in Tucson, six homes per month were being permitted without *any* water supply for fire protection. The fire district decided to create a code requiring all new homes to have an adequate water supply for fire protection as required by the Uniform Fire Code (UFC). During the political process, the builders association was initially concerned that the cost of the fire sprinklers would price some home buyers out of the market, but they said they would not speak for or against the issue. The fire district approached

the builders with the thought that the sprinklers would allow them (the fire district) to do their job. There were presentations made to the county boards who would make the final decision. According to the article, there was some initial opposition, but in September 1995, by a unanimous vote of the county board, the sprinkler ordinance became part of the Pima County, AZ proposed amended building codes. It still had to be voted on by the County Board of Supervisors. In February 1996, the ordinance was approved by the County Board of Supervisors. This ordinance was passed on a lack of hydrants in the area, the proposed ordinance in Sparks is based on response times. An article from the NFPA Journal (July/August 1997), indicated that in 1995, 79 percent of all fire deaths occurred in homes. Of these 4,585 fatalities, 66 percent are estimated to have occurred in single family homes. That means that four of five people who died in fires in 1995 did so in homes, and two of every three people who died in fires died in one and two family homes. As these statistics indicate, the most dangerous place for most of us in our own homes. In 1982, Rural Metro Fire Department in conjunction with the City of Scottsdale, AZ conducted residential fire tests in new residential structures to demonstrate the effectiveness of residential fire technology. A sprinkler ordinance was passed in Scottsdale in 1985 and the ordinance was in effect in January 1986. As of January 1996, 19,649 or 35 percent of Scottsdale's single family homes were sprinklered, as were 13,938, or 40 percent of the city's multi-family homes. According to the article, between 1986 and 1995, residential sprinklers activated in 44 of the 598 home fires that occurred in Scottsdale. Forty-one of these fires were controlled by one or two sprinkler heads. Two of the three fires which required more than two heads were flammable liquid arson fires. No one died in any of the sprinklered homes which had fires. During the time frame studied, 10 people died in 8 fires, all in unsprinklered single family homes. The report indicated that the amount of water

discharged in a sprinklered single family dwelling on fire was 209 gallons, as opposed to an estimated 3,690 gallons discharged by firefighters using hoselines to extinguish a house fire. Losses in sprinklered homes were lower also, $1,544 in sprinklered homes as opposed to $11,624 in unsprinklered properties. An article in Operation Life Safety, (November/December 1999), discussed recent residential fire sprinkler ordinance approvals, these are Orlando, Florida where all structures except small out buildings will require sprinklers, this ordinance will be effective in 2000. In Mesa, Arizona, Fire Chief Dennis Compton was finally successful, after seven years of effort to enact a residential fire sprinkler ordinance. This ordinance, like the Orlando ordinance excludes only small outbuildings. The Mesa ordinance also goes into effect in 2000. An article in Fire Protection Contractor (January 1997), discussed a fire in fraternity house on Mother's Day/Graduation Day that killed five students at the University of North Carolina, Chapel Hill, NC. This ordinance required all fraternity and sorority houses to be sprinklered within five years and all new fraternity and sorority houses would be sprinklered at the time of construction. The council also passed legislation requiring sprinklers in buildings over 6,000 square feet or exceeding height and access requirements of the fire department. A fire in Prince George's, MD, in 1991, according to an article in FIRE CHIEF, (July 1993), in a single family dwelling killed four unattended children. Former Fire Chief Steven Edwards pointed out, a similar fire had occurred the previous week in a sprinklered townhouse. This nighttime fire was quickly extinguished by one sprinkler head. According to the article, single family dwelling fires account for more than 50% of fire deaths in the United States. Ironically, these residences face the fewest fire regulations. This ordinance in Prince George's was the first single family dwelling sprinkler ordinance in the United States and was implemented on January 1, 1992.

PROCEDURES

The literature review for this project began in the Learning Resource Center at the National Fire Academy. Magazine articles dealing with residential fire sprinklers were taken and used an informational source for the project. A large amount of information was also taken from the Internet. Interviews were conducted with Robert King, City of Sparks Fire Marshal, in September and October 1999, concerning the proposed residential fire sprinkler ordinance. Meetings were also held with members of the Sparks City Council to inform them of the problem and the proposed ordinance. This meeting included the mayor of the city and two council members. At this meeting, the council members and the mayor were in favor of the proposal. Their feelings were that if the builders association was dead set against the ordinance, there may be alternatives acceptable to all parties involved in this matter. These alternatives that would be proposed were:

1. Sprinkler all residential structures located more than 8.5 minutes from the closest city fire station, on a case by case basis.
2. Require the sprinkler ordinance now and when a fire station is built in fire district #5, rescind the ordinance.
3. Require the sprinkler ordinance now and when a fire station is built in fire district #5, require sprinklers on a case by case basis.

These alternatives were presented to the builders association during a meeting in October. The builders association were not receptive to any of them and vowed to fight the ordinance tooth and nail. A meeting was also held with the Northern Nevada Builders Association to explain the proposal and to

learn what objections they had to the ordinance.

After the meetings with both the elected city officials and the builders association, the political process began. The process at city hall was lengthy and not very popular. The ordinance was brought before the city council, first in a study session, where public comment was allowed. During this meeting, there was much opposition to the ordinance from builders and developers, but none from potential home buyers. At this session, the city council listened once again to the proposal, and moved to have the proposal placed on the next council session as an agenda item.

In November 1999, proposal was brought before the city council during a regular city council meeting. At this council meeting, the members of the council who had initially showed support for the proposed ordinance seemed to change their minds. One member of the council said he wanted the ordinance to be stronger by requiring older residences be included if they were sold, moved to table the ordinance. There was not a second on this motion and the original ordinance was voted on. The final vote on this item was four to one against the ordinance as it was brought to council. The fire marshal was directed by the mayor and council to rewrite the ordinance with the builders association having input into the project. In addition to the ordinance, the developers would be asked to provide property for a fire station in the new development area.

Procedures for this project also included a survey of cities in Nevada which now require residential fire sprinkler ordinances. It was found that in Nevada, there are now only two cities requiring residential fire sprinklers. These are Henderson, which is in Southern Nevada near Las Vegas and Incline Village, which is at Lake Tahoe.

Limitations

Limitations encountered in doing research for this were that there was is not many articles in fire journals or magazines, concerning residential sprinklers. The majority of the information found was from the Residential Fire Safety Institute and Operation Life Safety which became the Residential Fire Institute. Other fire departments in the local area did not have any requirements for residential sprinklers and therefore were a limited source of information for the project. The information obtained from the Learning Resource Center at the National Fire Academy was somewhat dated, some as far back as ten years. It appears that because of cost primarily, elected officials are reluctant to require sprinkler ordinances in their cities. This may be why there is not many articles on cities who have been successful in enacting ordinances.

RESULTS

Answers to Research Questions

1. What would the cost per dwelling be for a fire sprinkler system, and what incentives would increase support for sprinklers?

The cost for installing a fire sprinkler system in new single family dwelling in the City of Sparks is the primary reason the Northern Nevada Builders Association objects to the proposed ordinance. Their contention is that the added expense of a fire sprinkler system would force many hew home buyers out of the market. They estimated the following costs for a residential fire sprinkler system.(Builders Association of Northern Nevada, October 1999)

1. New dwellings: $4,000.00 per home
2. Existing dwellings: $6,000.00 per home

These figures are higher than figures taken from numerous other sources. "Better Homes and Gardens" (September 1999), estimated the cost for a new residential sprinkler system at approximately two percent. The Residential Fire Safety Institute (firesafehome.org), October 1999, indicated the cost to be approximately one percent of the cost for a new home. As for the incentives, there were many to both the developer and the builder. Table #1 "Incentives and Who Benefits" on page 10, list the incentives and who benefits. Some of the incentives are longer hydrant spacing, narrower streets, reduced fire insurance, lower Insurance Services Office (ISO) ratings.

2. What are the objections of the Builders Association of Northern Nevada against residential sprinklers?

The primary objection to a residential fire sprinkler ordinance appeared to be the increased cost of construction. The builders association (Builders Association of Northern Nevada) October 1999, stated, in a report written to the mayor and city council, that requiring fire sprinklers in new residences would force many new home buyers out of the market. They also stated that fire deaths in new homes was not the problem, but that the City of Sparks could not provide adequate fire protection to the new neighborhoods, (because of longer response times), and that response times because of the lack of a fire station in this district was the real problem. The report went on to say that the city and the fire department should be trying to fix the real problem, not slapping a very, very expensive Band-Aid on a dying patient. The table below shows the percentage of fire deaths (according to the builders association) between new and old homes.

Table #3: Percentage of Fire Deaths in Single Family Dwellings

Percentage of Fire Deaths	Age of Home
1.3 Percent	**Less than 10 years**
9.4 Percent	**Less than 20 years**
28 Percent	**Less than 30 years**
48.3 Percent	**Less than 40 years**

In addition to the above listed objections to a sprinkler ordinance, other reasons for not wanting a sprinkler ordinance were, the systems leak, they can be activated by ambient temperature and not flames, losses don't warrant them, they are unsightly and insurance companies rarely give discounts for sprinklers. The other objections dealt mainly with building construction issues, such as fire stopping, fire separations between walls, sheetrock walls and wiring and other electrical components. Very few of these reasons mentioned that most fires in dwellings start as contents fires that could be easily controlled by a single sprinkler head. In addition to controlling fires quickly, the sprinklers used much less water than fire hoses, there by reducing property damage due to water.

3. What have other cities done concerning residential fire sprinklers?

Many other cities in the United States are struggling to convince elected officials that residential fire sprinklers are a much needed asset in areas where fire protection may be lacking due to high response times and or lack of hydrants. Some success stories are the Chapel Hill Story, the Prince

George's success, the Mesa, AZ story, the Tucson, AZ story. Even though these are all "Success" stories in enacting sprinkler ordinances, the majority of the sprinkler ordinances are the result of fatality fires. The Chapel Hill, NC story discussed a fire in fraternity house at the University of North Carolina, Chapel Hill. Five students died in this fire the night before graduation, which was also Mother's Day in 1991. As a result of this tragic fire, the city council passed an ordinance requiring the retrofitting of all existing fraternity and sorority houses, as well as the sprinklering of all newly constructed fraternity and sorority houses. It also required remodeled and new buildings which met fire department criteria to be sprinklered. The Prince George's ordinance resulted from a fire in 1991, which killed four children, a similar fire a week before, in a townhouse at night, was extinguished by one sprinkler head. A study conducted by Rural-Metro Fire Dept., Scottsdale, AZ revealed that between 1986 and 1995, 44 of 598 single family dwelling fires were extinguished by sprinklers. Of these 44 fires, 41 were controlled by one or two sprinkler heads. Mesa, AZ has been successful in implementing a residential sprinkler ordinance, this ordinance goes into effect in 2000.

DISCUSSION

The results of this research paper revealed that the City of Sparks is much like other cities in proposing an ordinance requiring residential fire sprinklers in single family dwellings. The Sparks ordinance was based on response times from the closest fire station. We used an 8.5 minute response time from the receipt of the call. This time (8.5 minutes), is well above the standard for our city which is 6.5 minutes. At one point during this process, the fire marshal considered using 6.5 minutes as the criteria to require residential sprinklers, members of the city council were adamantly opposed to this,

and the idea was dropped. Residential fire sprinkler systems in single family dwelling have been controversial for many years. Developers and builders associations have protested ordinances which would require the installation of these systems at the time of construction. Primary objections are cost to the builder and developer, although many other reasons have been used against such ordinances, things such as they leak, they are unsightly, they cause more water damage, ISO and insurance companies don't recommend them, new houses are not the problem, etc. The Residential Fire Safety Institute, (firesafehome.org) October 1999, listed nearly all objections that home builders have concerning residential fire sprinklers. Each issue from the builders associations was followed by a discussion of the true facts. An article taken from the Internet, (safekids.org) October 1999, explained that even though they have been proven to be effective, a 62 percent reduction in chances of dying in a fire when sprinklers are present, only two percent of homes have sprinklers installed. While conducting meetings with builders, we faced almost identical concerns from local builders, that had been published or on the Internet from builders across the nation. There are more incentives according to the Residential Fire Safety Institute, (firesafehome.org) December 1999, than ever before. These incentives should be attractive, not only to developers and builders, but also to the home buyer who stands to save money on insurance rates, the possibility of low interest home loans and a better ISO rating for the city. Many homeowners don't realize the benefits of fire sprinklers both in protecting life and property, but also in monetary savings over the years the mortgage is being paid off.

As Acting Fire Chief during many of the meetings held between the fire department, the elected officials and the builders association, I was astounded that the primary concern of the builders was the increased cost of construction, the lack of willingness to work with the fire department and implied

threats made concerning actions they would take if the ordinance were pursued by our department. Some of the threats included forming their own volunteer fire department in the new development area, something they would never be able to do, to bargaining contracts and work schedules. During the course of this research, I discovered many areas where I was lacking in knowledge concerning sprinkler systems in single family dwellings.

Residential sprinkler systems have proven themselves to be cost effective, not unsightly, or prone to leak, but instead have saved many lives and property. I think at a minimum, developers should offer sprinklers as an option to the new home buyer, the same as upgraded carpeting or appliances. They certainly pay off in the long run, primarily in life safety, but also in property conservation.

RECOMMENDATIONS

As I stated earlier, I have gained much knowledge concerning residential fire sprinklers during the course of this research. At first I wasn't sure about our fire department pursuing the sprinkler ordinance, but the more I learned, the more I felt it is something we should do. As stated before, this paper is part of the "Strategic Management of Change Class", and change in thinking is crucial to the success of the ordinance. I think there may be a misconception among the staff of our department that this ordinance will replace a proposed fire station in the new development. The staff needs to be informed as to the effectiveness in these systems and that the earlier we can complete overhaul and salvage on an extinguished fire, the sooner we can release equipment to be available for other calls. This information must also be imparted to the firefighters union to obtain their support. If the union thinks we are pushing for a sprinkler ordinance, in lieu of a new fire station, staffing and equipment, they will never support the proposal, nor should they. The builders association must be totally informed as to

the true facts concerning residential fire sprinklers, that they will not ruin sales of new homes, that they are effective and will save lives. The builders must also be responsible to help pay for protection of the public in the new growth areas, both for police and fire protection. Lastly, the elected officials in the city need to know that when they vote down an ordinance such as this, they may pay a heavy price later on, politically, should someone die in a fire in a building that could have been sprinklered as it was being built. As of the completion of this paper, the city council has placed the ordinance on hold and has directed the fire marshal to form a project team consisting of fire personnel, builders, legal, engineering and sprinkler contractors to develop a proposal that is acceptable to all concerned. The fire department needs to pursue this ordinance and hopefully have a successful resolution to the problem. The impact on the fire department would be terrible if there were to be a loss of fire in the new developments that could have been prevented with residential fire sprinklers.

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